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ELECTRONIC DELIVERY

California Energy Commission
Docket Office
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: Docket No. 06-IEP-1N
Comments on Draft Consultant Report "Nuclear Power in California"

Pacific Gas and Electric Company respectfully submits the following comments regarding the CEC's Draft Consultant Report titled "Nuclear Power in California: 2007 Status Report" released June 2007.

Thank you for considering our comments. Please feel free to call me at the number above if you have any questions.

Sincerely,

Les Guliasi /ewl

Les Guliasi

LG/ewl
Attachments

DOCKET NO. 06-IEP-1N
PG&E'S RESPONSES TO CEC DRAFT CONSULTANTREPORT ON *NUCLEAR POWER IN CALIFORNIA: 2007 STATUS REPORT*

INTRODUCTION

Pacific Gas and Electric Company (PG&E) is pleased to provide the following comments on the June 2007 Draft Consultant Report prepared by MRW & Associates entitled, *Nuclear Power in California: 2007 Status Report* (Draft Consultant Report). PG&E and the California Energy Commission (CEC) share the common goal of gathering the most accurate and reliable information about California's nuclear power industry and its future in order to engage in a meaningful, fact-based dialogue about California's policies relating to nuclear power. PG&E believes that the Draft Consultant Report contains valuable and accurate information but is in need of significant revisions, particularly to those areas that present recommendations.

PG&E's comments and suggestions generally fall into three categories. The first category involves corrections to factual depictions contained in the report. The second category includes information that should be, but was not, included. For example, PG&E believes the Draft Consultant Report should contain more information about fuel reprocessing. The third category involves areas where PG&E believes both sides of an issue were not given equal or appropriate weight. In some instances, the draft report compares the results of a well documented study with an opinion of one individual as if each should be given equal weight. PG&E understands that nuclear issues can be controversial and can often be driven by unsupported opinions. PG&E strongly believes that California should perform a fair and unbiased assessment of each issue associated with nuclear power. The first step in engaging in such an assessment is to ensure that while all points of view are acknowledged in the Draft Consultant Report, not all points of view are supported by evidence that would warrant the report giving them equal weight. In some cases this results in flawed recommendations. Weighing of the evidence should be left to the decision makers.

The Draft Consultant Report concludes with several recommendations contained in Chapter 13. PG&E believes that the evidence, and in some cases the analysis of the report itself, does not support some of the recommendations. Our key comments on the recommendations are presented below:

- The recommendation that the state legislature needs to develop a suitable framework for reviewing costs and benefits of power plant license extensions ignores the existing role of the state in the comprehensive federal review of license extension and the work by the CEC to implement AB 1632. New legislation is not necessary.
- Similarly, while PG&E supports the recommendation that the CEC should continue to monitor the GNEP program, the recommendations that reprocessing still has substantial implications for U.S. efforts to halt the proliferation of nuclear weapons fails to take into account the primary policy driver behind the GNEP, which is to develop a reprocessing technology that will *deter* proliferation. Such a technology could result in federal policy decisions to fund a reprocessing program.

- PG&E does agree with the recommendation for the CEC to continue to monitor the federal high-level waste disposal and spent fuel storage and management programs. However, the CEC needs to look at both the positive indications (like the DOE plan to submit a license application in 2008 and the fact that the technical issues are being resolved) as well as the past troubled history of the subject.
- PG&E believes that nuclear power plays a critical role in helping the state meet its GHG emission goals and reduction strategies. While PG&E does not object to a comprehensive review of lifecycle emissions for all generation technologies, including renewables, there is no reason to focus only on nuclear power generation in identification of lifecycle environmental effects. The report should more carefully delineate the lifecycle environmental effects of all generation technologies to allow a fair comparison. The draft report, in high summary, suggests that lifecycle impacts for other technologies, including renewables, are equal to or greater than nuclear power. A fair assessment would conclude that the impact of lifecycle emissions is not a unique or significant issue for nuclear power as compared to other technologies.

Our comments on particular chapters and topics are provided below. PG&E recommends that the Draft Consultant Report be revised in accordance with the specific comments outlined below and those comments made at the public workshops. The report should then be recirculated for additional public and stakeholder input.

RESPONSE TO EXECUTIVE SUMMARY

RESPONSE TO Future of Nuclear Power

On page 7, line 1, PG&E recommends that the words "Low-level radioactive waste will not be stored at Yucca Mountain" change to "will not be buried at Yucca Mountain" [no off-site LLRW storage has ever been available in the USA. LLRW is shipped off-site to be "buried." Storage implies retrieval. LLRW off-site is not to be retrieved.]

On page 7, lines 6-9, PG&E recommends that the words "Beginning in mid-2008 only the Utah facility will be available and only for the least radioactive grade of wastes. In the near term.... California utilities will be forced to keep their low level waste on-site." change to "Beginning in mid-2008 only the Utah facility will be available and only for the least radioactive grade of waste (Class A). In the near term,....California utilities will be forced to store higher activity Class B and C waste on-site." [As stated, this paragraph implies that all LLRW will have to be stored on site assuming that the lowest grade (Class A) is a small volume. This is false. The largest quantity of LLRW generated is Class A and it will not require on-site storage after mid-2008. Only 200-300 cubic feet of Class B/C waste is generated per year; this small quantity is all that will need to be stored on site.]

On page 14, line 1, PG&E recommends that the words "...California has limited options for storage and disposal of low-level nuclear wastes. California utilities may need to permanently store low-level nuclear waste..." change to "...California has limited options for storage and disposal of low-level radioactive waste. California utilities may need to permanently store some low-level radioactive waste..." [Nuclear waste is a legal term for spent fuel and high level waste. It is not possible for nuclear waste to be "low-

level." The proper term is "radioactive" waste. It is not true that all LLRW will need to be stored on-site. Only the small quantity of Class B/C waste generated needs to be stored on site.]

On page 27, lines 17, 18, and 20, PG&E recommends that the words "...only one facility that will accept all but the least radioactive of nuclear waste...after which time the utilities will need to store this waste on-site (NRC 2007)" change to "...only one facility that will accept all Classes of low-level radioactive waste...after which time the utilities will need to store the Class B and C waste they generate on-site (NRC 2007)." [LLRW cannot be called nuclear waste. On-site storage only required for Class B and C waste.]

RESPONSE TO CHAPTER 1 – INTRODUCTION

PG&E does not have any comments on this chapter.

RESPONSE TO CHAPTER 2 – NUCLEAR POWER IN CALIFORNIA

PG&E does not have any comments on this chapter.

RESPONSE TO CHAPTER 3 - STORAGE AND DISPOSAL

On page 13, in the second to the last paragraph, the Draft Consultant Report states that the CEC may not conclude that the U.S. DOE will ever succeed in opening the permanent repository at Yucca Mountain. This statement would be less speculative if it were rephrased in a short-term context. For example, "...the CEC cannot conclude that the U.S. DOE will succeed in opening the permanent repository at Yucca Mountain in the near future." The suggested rewording places the statement in less speculative terms, particularly given DOE's plan to submit a license application in 2008, and the fact that progress is being made on technical issues.are being resolved) as well as the past troubled history.

RESPONSE TO CHAPTER 4 - REPROCESSING AND THE GLOBAL NUCLEAR ENERGY PARTNERSHIP

In Chapter 4, the draft report includes an update on the status of nuclear fuel reprocessing, both in the United States and internationally. While, for the most part, the Chapter is well researched and factual, it relies too heavily upon the opinions of a few prominent opponents of nuclear fuel reprocessing as the basis for its ultimate conclusions about the prospects for future success and associated time tables. In order to enhance the credibility of the chapter, PG&E recommends that less emphasis be placed on the opinions of a few and that the overall negative conclusions in the report be made more neutral to reflect the legitimately uncertain prospects for current efforts in the U.S. In its comments on this section, PG&E offers three thoughts:

1. The discussion of existing law and its applicability to fuel reprocessing needs to be clarified;

2. The report would be more balanced if reference to other assessments (identified in our comments) were included in the report; and

3. The chapter relies too heavily on the negative opinions of a few in reaching its overall conclusions about the prognosis and timeframe for deployment of fuel reprocessing in the United States. PG&E suggests that the draft report be modified to eliminate the few unfounded conclusions and projections about the future of reprocessing and focus on facts and findings about current technologies and programs.

Chapter 4 opens with a misstatement of the legal standard in Public Resource Code Section 25524.2. It states that the "moratorium on building new nuclear power plants will continue until a technology for the permanent disposal or reprocessing of spent fuel had been *demonstrated* and approved for use in the U.S." (Draft Consultant Report, page 57, emphasis added) The actual language in the statute is that the moratorium will continue until the commission finds "there has been developed and that the United States through its authorized agency has approved and there exists a demonstrated technology or means for disposal of high-level waste" which is defined as "a method for the permanent and terminal disposition of high level waste" and, further, that "nothing in this section requires that facilities for the application of that technology or means be available at the time that the commission makes its findings." The statute does not require that the technology be demonstrated in the United States.

As the draft report notes, DOE's goal is to commercialize an advanced reprocessing system by 2025. The opening sentence of Chapter 4 incorrectly states that the technology must be "demonstrated and approved for use in the U.S." This requirement is not contained in the statute. PG&E suggests that the draft report be modified to read, "...demonstrated and approved for use in the U.S.," or that the report reference the statute rather than attempt to paraphrase it.

PG&E also believes that the draft report should be supplemented to restore an appropriate balance. The Department of Energy has made major strides toward implementation of the Global Nuclear Energy Partnership (GNEP). Over the next year, DOE plans to publish a draft Programmatic Environmental Impact Statement (PEIS) concerning GNEP, issue a final PEIS that takes public comments into account, and issue a Record of Decision (ROD) that specifies the aspects of GNEP that will be pursued. While opinions differ widely on the potential advantages and disadvantages of GNEP, the work that is ongoing under GNEP clearly represents the most extensive Federal Government support for reprocessing and recycling of spent power reactor fuel since the mid 1970s.

To be in a position to evaluate and comment objectively on GNEP as well as ongoing programs of France, the United Kingdom, Russia, and Japan to reprocess and recycle spent fuel, the CEC must assess arguments in favor of these programs as well as the views of those who oppose these programs. Collaboration with U.S. allies to achieve U.S. nuclear nonproliferation and national security objectives is a key aspect of GNEP.

Because GNEP does not deal solely with deployment of domestic reprocessing and recycling facilities but also has the nonproliferation and national security objectives described above, the rationale for that program should not be predicated exclusively on the costs of building and operating the advanced burner reactor and advanced reprocessing facilities that are foreseen by GNEP. While these costs are clearly a valid

consideration, the President and Congress may decide that U.S. national security objectives require that the Federal Government bear a substantial portion of the cost of developing, deploying, and operating such facilities. California law recognizes that the U.S. Constitution entrusts such national security matters to the Federal Government. Consequently, in assessing the economic aspects of the advanced domestic programs and facilities that are being evaluated under GNEP, the CEC should take into account GNEP's national security goals and avoid basing its commentary on GNEP solely on an economic assessment of the viability of the advanced fuel cycle facilities that are the domestic goals of GNEP.

An objective and complete evaluation of the potential advantages and disadvantages of reprocessing and recycling of spent fuel is also timely in view of the completion of the Rokkasho Reprocessing Plant in Japan. Recently completed after years of developmental efforts and a massive construction program, the Rokkasho facility uses advanced reprocessing technology and is subject to International Atomic Energy Agency (IAEA) safeguards that the IAEA has determined will effectively provide real-time monitoring of the streams of nuclear materials that will be generated through its operation. An understanding of this facility is important in an objective consideration of the role that a modern reprocessing facility may play in a country, such as Japan, that has an advanced nuclear fuel cycle under IAEA safeguards.

A key objective of this section of the Draft Consultant Report is to summarize the views on reprocessing and recycling of spent fuel and also provide information concerning conference proceedings and other publicly available compilations that set forth articles by authors in the United States and elsewhere who are leading R&D efforts concerning reprocessing and recycling of spent fuel. Both supporters' and opponents' views should be included. Below are a few suggestions for additional balance:

Reprocessing of spent fuel and deployment of a new generation of advanced reactors are among Senator Pete Domenici's key proposals in his recently published book, *A Brighter Tomorrow: Fulfilling the Promise of Nuclear Energy* (Roman and Littlefield publishers, 2004).

While Senator Domenici's book covers a wide range of energy and security matters, his discussion of the energy and nonproliferation aspects of reprocessing spent fuel and using plutonium in civilian nuclear power reactors are addressed primarily in chapter 8, entitled "Dealing with Nuclear Proliferation Effectively."

Articles by Leading Proponents of Reprocessing and Recycling:

"Purex v. Pyro" by Hannum/Marsh/Stanford

Commentary concerning the technical aspects of reprocessing and fast reactors is particularly valuable when it comes from nuclear physicists who have devoted their professional careers to such matters. The three authors of a recent article concerning advanced reprocessing technology are particularly well qualified to speak on this subject. In their article, "Purex and Pyro Are Not the Same," William H. Hannum, Gerald E. Marsh and George S. Stanford, have based their commentary on their extensive experience as reactor physicists, at Argonne National Laboratory, (ANL), from which they are retired after long careers.

Tracing the history of U.S. governmental policy concerning reprocessing, the authors stress the "fundamental differences between the 'Purex' reprocessing method and the 'dry' (nonaqueous) pyrometallurgical method." They describe this process as inherently lacking the capacity to produce plutonium of weapons-quality purity. As they point out, the pyrometallurgical method of reprocessing is well suited for use in the fast-reactor fuel cycle, which is a key objective of GNEP. They state that the advantage of fast reactors, "in addition to a proliferation-resistant fuel cycle," is that they "can consume plutonium and other long-lived actinides, reducing to less than 500 years the required isolation time for waste in a repository, postponing indefinitely the need for such repositories." They also observe that such reactors "can get more than 100 times as much energy from uranium as the once-through fuel cycle, and more than 50 times as much as thermal reactors with aqueous recycle." Furthermore, they provide detailed support for their argument that failing to pursue recycling of spent fuel in the U.S. "only aggravates the disposal problem and encourages the waste of uranium resources."

Article by David Rossin

David Rossin is a former Assistant Secretary of Energy who has made an extensive study of U.S. policy concerning reprocessing and recycling of plutonium. As Mr. Rossin points out in a paper delivered at the Waste Management (WM)'99 seminar in Tucson, Arizona, the notion that a 1962 weapons test in the United States established that reactor grade plutonium could be used to make a nuclear weapon has been discredited by Dr. Carson Mark, who is often cited as the source for that conclusion. Discussing that test in 1962, Dr. Mark observed as follows: "We carried out one experiment with highly radiated plutonium (a special test carried out in 1962). It has been misinterpreted as proof that you can make a weapon out of reactor-grade plutonium. That thing wasn't a weapon. It was a very small explosive. It couldn't have been predetonated and the yield was very small." Mr. Rossin's source was Michael M. May, "Nuclear Weapons Supply and Demand," American Scientist v. 82, pg 526, Nov.-Dec. 1974; see discussion in paper by A. David Rossin, "U.S. Reprocessing and Nonproliferation Policy," in WM 99 Proceeding, available at www.wmsym.org.

Public Broadcasting Service Frontline Interview with Dr. Charles Till

In a Public Broadcasting Service interview, Dr. Charles Till commented on the objectives of DOE's Integral Fast Reactor (IFR) program. Dr. Till, a nuclear physicist and associate laboratory director at Argonne National Laboratory West, in Idaho, was co-developer of the IFR. According to Dr. Till, the IFR is an "inherently safe nuclear reactor with a closed fuel cycle." The interview is available at:
www.pbs.org/wgbh/pages/frontline/shows/reaction/interviews/till.html.

The advanced burner reactor that is an essential aspect of the domestic reprocessing and recycling facility envisaged by GNEP has its roots in the IFR. The success achieved with the IFR project is an important building block for the GNEP's advanced burner reactor. An important factor in evaluating the likelihood that the advanced burner reactor can be designed and built is the significant experience in the United States with the IFR and the extensive experience with fast reactors in Russia, France, and Japan.

International Conferences Concerning the Back-End of the Fuel Cycle

Decades of experience in several countries supports efforts under GNEP and other national programs to develop and deploy advanced reprocessing technology and fast reactor systems. This extensive and long-standing research is well documented in various publicly available sources, including the proceedings of international conferences held on an annual or semi-annual basis.

GNR2 Conference

The first of what is intended to be an annual conference, Global Nuclear Recycling and Reprocessing ("GNR2"), was held in Seattle, Washington, June 11-14, 2007. Organized by WM Symposium Inc. and sponsored by the American Nuclear Society, the inaugural session of the GNR2 conference attracted about 125 participants from the United States, Japan, France, the United Kingdom, and other countries. Speakers included several DOE officials and the Chairman of Japan's Atomic Energy Commission.

In his opening address at the GNR2 conference, NRC Commissioner Dr. Peter Lyons explained the steps that the NRC planned to take to be able to discharge its regulatory role in connection with licensing of the reprocessing plants and advanced burner reactors that are envisaged. "Closing the Fuel Cycle – A Regulator's Perspective," 1st Global Nuclear Fuel Cycle Reprocessing and Recycling Conference, June 11-14 2007; available at www.sym.org. In addition to reviewing reprocessing facilities that operated in the U.S., Commissioner Lyons emphasized the need for the United States to draw upon international experience in these fields.

Global Conference

For many years, an annual international conference, known as the "Global Conference on back-end of the fuel cycle," has been organized by companies that are active in this field, and is sponsored by the American Nuclear Society, the European Nuclear Society, and the OECD/NEA, in cooperation with the IAEA. Abstracts of the dozens of papers presented each year at these "Global" Conferences illustrate the major efforts that have been conducted on such matters for years in the United States, France, Japan, South Korea, China, Russia, and throughout Western Europe. A particularly useful review of progress with R&D concerning advanced reprocessing and recycling systems is available in proceedings of the "Global 2001 International Conference on Back-end of the Fuel Cycle: From Research to Solutions," held in Paris, France, September 9-13, 2001.

Annual Waste Management Conference

A publicly available compendium of an annual international conference that addresses recycling and reprocessing, in addition to nuclear waste matters, is available in the proceedings of the Annual Waste Management (WM) Symposium held annually in Tucson, Arizona. Organized by WM Symposia Inc. (WMS), this annual conference is sponsored by the American Nuclear Society, and conducted with the cooperation of the IAEA and the U.S. DOE. (Proceedings are available from WMS, at www.wmsym.org.)

The significant progress that has been achieved on fast reactor systems and advanced reprocessing technology is evident from a review of papers that are published in proceedings of this annual conference.

RESPONSE TO CHAPTER 5 - NUCLEAR WASTE TRANSPORT

On page 6, first paragraph, it states that all the experience of decades of shipping fuel in the U.S. from research reactors and the navy program "pales in comparison to the volume of shipments that will be required for the Yucca Mountain shipping endeavor." PG&E would restate this to say more logically that decades of safe transportation experience provide a good basis to believe that it can continue in the future for shipping to Yucca Mountain.

On page 101, PG&E recommends that the words "Low-Level Waste Shipments" change to "Low-Level Waste" [This section covers much more than just LLRW shipments].

On page 7, PG&E recommends that the words "... no facility available to California for disposal of any but the coolest of radioactive material" change to "... no facility available to California for disposal of Class B and C waste. Although small in volume, Class B and C waste contains most of the activity in low-level radioactive waste." [It is not factually correct to term Class A waste as "coolest."]

On page 102, line 2, PG&E recommends that the words "... Class C wastes are much hotter than Class B wastes, which are much hotter than Class A wastes" change to "Class C waste is a hazard much longer than Class B waste, which is a hazard for longer than Class A waste." [Temperature has nothing to do with the hazard from LLRW.]

On page 102, PG&E recommends that the words "Low-Level Waste Facilities" change to "Low-Level Waste Disposal Facilities" [The section only covers disposal site, not waste processors or transportation companies].

On page 102, lines 11, 12, and 14, PG&E recommends that the words "... only one new disposal facility has been built since the Act was passed and this facility accepts only Class A waste." "Today there are only three operating low-level waste disposal facilities in the U.S." change to "... only one new disposal facility has been built since the Act was passed. This facility accepts only Class A waste and was developed outside the Compact system." "Today there are only three operating commercial low-level waste disposal facilities in the U.S." [There are several DOE Low-level waste disposal sites in the U.S. (e.g., Nevada test site; Hanford, WA; Oak Ridge, TN.; Savannah River, SC).]

On page 103, line 4, PG&E recommends that the words "A current effort to develop a hazardous waste facility in Andrews County..." change to "A current effort to develop a radioactive waste disposal facility in Andrews County..." [A hazardous disposal facility already is in operation at the Andrews County site in Texas. The site also has radioactive waste treatment services. Radwaste disposal is what is being developed.]

On page 103, last line, PG&E recommends that the words "... tritium and carbon-14 were found around the Nevada low-level waste ..." change to "... tritium and carbon-14 were found around the Beatty, Nevada low-level waste..." [The DOE has a LLRW burial site in Nevada so this line needs to call out the commercial Beatty site].

On page 104, PG&E recommends that the words "Closure of the Barnwell Facility to Non-Compact States" change to "Closure of the Barnwell Facility to Non-Atlantic Compact States" [California is in a Compact but will be denied access. States not in the "Atlantic" Compact will lose access to Barnwell.]

On page 104, after the title "Waste Shipments from California's Reactor Sites" PG&E recommends insertion of a sub title, "Used Fuel shipments" and additional information on the shipments from Humboldt Bay. [This last paragraph is about used fuel shipments, not LLRW.]

On page 105, PG&E recommends insertion of a subtitle "Low-Level Radwaste Shipments."

PG&E recommends a change in line 1, from "In addition, the utilities have been shipping low-level radioactive waste out of state, mainly to the low level waste disposal facilities in South Carolina and Utah." to "California utilities have been shipping low-level radioactive waste out of state to low level waste disposal facilities." [A large volume of waste was shipped to Richland, WA and Beatty, NV sites before 1993.]

PG&E recommends adding "Diablo Canyon has a shielded storage building that can hold Class B and C waste on-site through plant life."

On page 106, last paragraph, line 3, PG&E recommends that the words "...all available space at the facility beginning in July 2007 has already been reserved, ... to take advantage of the facility" change to "... all available space at the Barnwell facility beginning in July 2007 has been reserved,... to dispose of Class B and C waste."

On page 107, last paragraph, PG&E recommends changes to:

"The number of low-level waste shipments from California will be slightly reduced (by a few shipments per power plant per year) when the Barnwell, SC facility closes to out of Compact waste. Beginning in July 2008, California utilities will have access to off-site disposal for the least radioactive (Class A) low-level waste. Class B and C waste from the power plants will remain on-site.

RESPONSE TO CHAPTER 6 - SUNK COSTS OF CALIFORNIA'S NUCLEAR PLANTS

Diablo Canyon Sunk Cost (pg. 108)

"Sunk Cost" usually is used to refer to the capital investment in a plant at a given time. This section refers to the total cost customers paid for the output of Diablo Canyon through 2006. PG&E recommends referring to this as "Historical Cost" or "Past Cost."

The text refers to $33/MWH in 2002. This should be $35/MWH.

In Table 22, restating the dollars to 2006 misrepresents the cost under the settlement. PG&E recommends that dollars are shown in nominal dollars or both nominal and 2006 dollars.

Going Forward Capital Costs (pg. 109)

The text states, "Diablo Canyon's turbine rotors were recently replaced, and no additional large capital projects are currently planned for the facility." This should also say "with the exception of the Steam Generators and Reactor Vessel Heads."

Steam Generator Replacement Projects (pg. 110)

"The utilities' estimates of $706 million (PG&E) and $680 million (SCE) in SGRP related expenditures are reasonable." These numbers are misleading. SCE's numbers are

in 2004 dollars and exclude AFUDC. PG&E's numbers are in nominal dollars and include AFUDC. There are some other differences that make the numbers not comparable. This should be noted or stated on the same basis.

Reactor Vessel Head (pg. 110)

The current estimate for the replacement of the reactor vessel heads is $110 million.

Nuclear Fuel Costs and Supply (pg. 111)

The table is incorrect. Including spent fuel fees the numbers should be:

2006	$106
2005	$67
2004	$126

Excluding the DOE spent fuel fees the numbers should be

2006	$87
2005	$50
2004	$108

For both cases the numbers should be on a comparable basis with SCE's. These numbers are in 2006 dollars.

On page 7, under Cost discussion, the Draft Consultant Report says that "incentive mechanisms have had a secondary impact of making it more difficult to determine in retrospect the true costs of these plants." The cause of the difficulty is simply not related to incentive mechanisms. Historical cost under incentive ratemaking mechanisms is not relevant to determining the current or future or fully loaded cost to operate a nuclear power plant.

RESPONSE TO CHAPTER 7 - NEW PLANTS/COSTS

PG&E does not have any comments on this chapter.

RESPONSE TO CHAPTER 8 - COST IMPLICATIONS OF A NUCLEAR RENAISSANCE

On page 137, the discussion states that spot sales of uranium comprise less than 20 percent of the uranium market. This is true, but these spot prices are being used in forward-priced long term contracts. Thus, as spot prices go up, long term contract prices go up. This is a change that has come about over the past two years due to the rapid increase in uranium prices.

Page 139: Russia has clearly stated that it does not intend to continue the sale of blended down Highly Enriched Uranium (HEU) to the U.S. after 2013.

Page 141: the DOC [spell out DOC first] continues to review the current restrictions on the import of Russian uranium and enrichment into the U.S. The restrictions continue even though the AHUG [spell out AHUG] (a utility group representing 85 percent of the U.S. nuclear utilities) has battled the DOC/ITC [spell out] in court to remove the

restrictions. The DOC has rescinded the duties on all countries except France. The AHUG is in court working to force DOC to complete the courts earlier orders to remove all duties from enrichment services. The report should state that the restrictions are under legal review and being eliminated.

Page 142: the new NYMEX uranium futures market is financial only. Utilities can not buy uranium from this market or through this mechanism.

On age 144, PG&E would recommend that the words "...making the steel pot that hosts the chain reaction" change to "....making the reactor pressure retaining vessel that hosts the reactor fuel and subsequent chain reaction."

RESPONSE TO CHAPTER 9 - NUCLEAR POWER AND THE ENVIRONMENT

PG&E does not have any comments on this chapter.

RESPONSE TO CHAPTER 10 - SECURITY FOR REACTORS & SPENT FUEL

In a few areas, the Draft Consultant Report incorrectly states or cites conclusions of available technical work. For example:

On page 25, second paragraph, the Draft Consultant Report states that "though nuclear power does not emit GHGs during plant operation, the overall nuclear fuel cycle does result in GHG emissions. These emissions are less ... than the emissions produced by gas, oil, and coal fired generation, but they are greater than the emissions produced by some renewable technologies and energy efficiency." More correctly this should be stated that the life cycle GHG emissions of nuclear are "on par" with renewable technologies. PG&E agrees that some studies show a slightly higher amount of GHG for the nuclear life cycle than other renewables; however, the Draft Consultant Report statement here implies incorrectly that the nuclear is closer to the fossil generating technologies rather than in the good company of renewables. This was repeatedly agreed upon by various experts at the public workshops.

RESPONSE TO CHAPTER 11 - RELIABILITY & SAFETY

PG&E does not have any comments on this chapter.

RESPONSE TO CHAPTER 12 - THE FUTURE OF NUCLEAR POWER

On page17, last paragraph, the Draft Consultant Report states that license extensions could keep the aging fleet of U.S. power plants operating for an additional 20 years with uncertain economic and reliability implications. PG&E notes that this statement is not only conjecture but wrong. When re-licensed, the reliability and economics are assessed and evaluated on equal certainty with other technologies. Moreover, PG&E objects to the use of the word "aging" throughout the document because of the implied inferiority of older nuclear plants. In fact, all operating plants manage equipment reliability using

planned maintenance and replacements to ensure that the plants run efficiently and reliably throughout their license or license extension time period.

On page 11, regarding the discussion on security of reactor facilities, the Draft Consultant Report states that the U.S. NRC has not explained why it rejected some of its staff's proposals. PG&E has been working very closely with the NRC on security of nuclear facilities and this statement is simply not true or relevant. Furthermore, the NRC isn't "struggling to balance costly security upgrades." These security upgrades have been costly and have been made. They are appropriate upgrades to guard against a reasonably postulated terrorist attack. Further speculation about the adequacy of these measures only stirs questions of whether facilities are secure, which in fact they are required to be by law.

On page 28, third paragraph, the Draft Consultant Report incorrectly states or cites conclusions of available technical work.

On page 28, third paragraph, the report cites the work of the UCS on the risk profile over a reactor's life with the "bathtub" curve. Though this theory is sound, it fails to reflect the actual situation with nuclear power plants which is that there is an active program that constantly monitors, maintains, and changes out equipment throughout the life of a plant. In this way the reliability of the overall plant is maintained constant, or even improved over its operating lifetime.

RESPONSE TO CHAPTER 13 - NUCLEAR POWER 2007: IMPLICATIONS FOR CALIFORNIA

Chapter 13 contains a number of preliminary policy recommendations that are proposed for adoption in the 2007 IEPR. PG&E provides its comments on each of these recommendations.

1. *The Legislature should develop a suitable framework for reviewing the costs and benefits of nuclear power plant license extensions and clearly delineate agency responsibilities, scope of evaluation, and the criteria for assessment.*

   This recommendation appears to be an unnecessary repeat from the 2005 IEPR. There is no need for the Legislature to take action or develop a framework for reviewing license extension for California's nuclear plants because such a framework already exists at the Nuclear Regulatory Commission, and the state, through actions of the CPUC and the CEC, has already created an appropriate complement to the NRC process. As discussed at pages 223-234 of the draft report, there already exists a comprehensive process for review of license extension at the NRC, and this process includes a specific role for the state. In addition, the CEC, through the AB 1632 process, will prepare a supplemental assessment of issues affecting license extension, and the AB 1632 study, in turn, will be incorporated and addressed by PG&E when it files its application at the CPUC to assess the cost effectiveness and customer benefits associated with license extension. Thus, the state has already adopted an effective framework for complementary review of and participation in the license extension process. This recommendation should be modified to reflect the successful adoption of the complementary state framework and to delete the suggestion that further action by the legislature is required.

2. *Therefore, the Energy Commission is not likely to receive a license application from PG&E or SCE or from a third party group for the construction of a new nuclear power plant in California in the next two years.*

   PG&E has no comments on this finding.

3. *Since such findings have not been made to date, we conclude that the Energy Commission could not provide land use permits or certification for a nuclear power plant in California at this time. It is unlikely that the Energy Commission would be able to make such a finding in the near future.*

   PG&E has no comments on this finding.

4. *At this time the Energy Commission can conclude that reprocessing is still substantially more expensive than waster storage and disposal.*

   At this time the Energy Commission can conclude that reprocessing still has substantial implications for U.S. efforts to halt the proliferation of nuclear weapons material.

   The Energy Commission should continue to monitor the GNEP program.

   PG&E recommends that the first two paragraphs of this recommendation be deleted. The first finding fails to take into account the national security benefits potentially associated with reprocessing and the prospect that the Federal Government could decide as a matter of policy to fund significant portions of a reprocessing program in order to deter nuclear proliferation. The decision whether or not to proceed with the GNEP program will not rest solely on whether it is more economic than waste storage and disposal. The second paragraph should be deleted because it ignores the fundamental policy driver behind the GNEP, which is to develop a reprocessing technology that will deter proliferation. The final paragraph is an appropriate finding and recommendation.

5. *At this time the Energy Commission has no basis to conclude that DOE will succeed in opening the permanent repository at Yucca Mountain in the near future. Until a permanent repository at Yucca Mountain or at an alternative location either begins operation or can be credibly expected to begin operation using a demonstrated disposal technology, the Commission cannot find that the federal government has approved and that there exists a demonstrated technology for the permanent disposal of spent fuel from these facilities. DOE's failure to license and operate a permanent repository has imposed substantial costs on California's consumers who have paid over a billion dollars to the federal government for this service and have had to incur the costs of building and operating interim fuel storage facilities.*

   The Energy Commission should continue to monitor the federal high-level waste disposal and spent fuel storage and management programs with regard to their implications for California and the moratorium on new nuclear power plant permitting and certification in the state.

   PG&E recommends that the first paragraph be deleted because it contains conclusions that result from an inappropriate weighting of the data in the draft report. Recommendation number 3, above, already makes the finding that there is not an

adequate basis for lifting the state moratorium. The second paragraph is an appropriate recommendation.

The first paragraph contains a number of negative findings that are unfounded and unnecessary for this report. As an example, there have been a number of developments that could lead the Energy Commission to conclude that some progress is being made on the licensing of a spent fuel repository at Yucca Mountain. DOE is scheduled to file its license application at the NRC next year. Congress has funded the effort. DOE and associated agencies have made considerable progress in assessing transportation routes and impacts. It is without question that there has been substantial progress on Yucca Mountain since the 2005 IEPR. Nonetheless, the draft report findings disregard this progress, and the report concludes that there is no credible basis to assume that Yucca Mountain will begin operations or that a long-term storage technology will be developed. PG&E believes that the draft report does an adequate job of assessing the developments for long term spent fuel storage in Chapter 3. However, the summary above does not fairly reflect the data summarized in the chapter.

6. *California has limited options for the storage and disposal of low-level nuclear wastes. California utilities may need to permanently store low-level nuclear wastes at the coastal sites of their nuclear power plants.*

   This recommendation overstates the concern about storage of low-level radioactive waste. PG&E accumulates low level radioactive waste at Diablo Canyon only until it is shipped offsite under contracts in place for out-of-state disposal. PG&E anticipates that it will complete decommissioning of its Humboldt facility prior to closure of the Barnwell facility and will be able to fully decommission, remediate, and dispose of nuclear waste at the Humboldt site (with the exception of the storage of spent fuel and greater than class C waste in its on-site dry cask storage facility). While there is some future uncertainty for Diablo Canyon about disposal of low level waste, the draft report finding overstates the existing problem. It would be better to find that currently there is not a low level waste disposal problem for Humboldt decommissioning and Diablo Canyon operations but there is some future uncertainty after closure to California of certain of the existing repositories.

7. *The State should encourage the utilities to continue to seek damages from DOE to recover all costs related to interim waste storage.*

   It is not necessary for the state to encourage PG&E to pursue damages from DOE for breach of the spent fuel contracts. PG&E is vigorously pursuing the litigation against DOE and has already achieved a significant multi-million dollar judgment in favor of its customers. In addition, PG&E makes periodic reports to the staff of the CPUC on its progress. This recommendation should be modified to commend PG&E for its successful efforts achieved to date and to have the state continue to monitor and support future litigation.

8. *The State should consider the implications of these disputes and encourage the NRC to work with the National Academies' panel of experts to resolve these concerns.*

   PG&E has no comment on this recommendation.

9. *The State should consider other means to ensure that a study of the implications of terrorism is performed, such as a request to the Department of Homeland Security or the Government Accountability Office.*

   PG&E suggests that this recommendation be modified. First, the proposed recommendation fails to take into account the substantial actions (summarized in Chapter 10) taken by the NRC to improve plant security. While there is an ongoing debate about whether and to the extent a terrorism threat review should be conducted as part of an environmental assessment, there is no doubt that the NRC has significantly intensified its security programs and safety assessment as required under the Atomic Energy Act. PG&E does not believe that the findings in the draft report support a conclusion that the NRC's actions to ensure security at California's nuclear plants have been inadequate and that it is necessary to look to other Federal agencies to bolster or review the NRC's efforts. The recommendation should be modified to have the state continue to monitor the NRC's efforts to ensure plant security at California's nuclear plants.

10. *The State should evaluate DOE's increasing use of California routes to transport nuclear waste to and from Nevada.*

    The Energy Commission should continue its participation in collaborative processes at the national and regional level to ensure that the State's interests are represented.

    The Energy Commission should continue to coordinate the California Interagency Transport Working Group to plan, prepare, and initiate state needs assessments from spent fuel and other large radioactive shipments in California.

    The Energy Commission should continue to participate in DOE's route selection and transportation planning proceedings.

    As recommended in 2005, the State should reexamine the adequacy of California's nuclear transport fees and federal funding programs to cover the state's costs of spent fuel shipments.

    The State should continue to work with other states to ensure that DOE provides states with the support that they need to prepare for shipments and establishes flexible procedures.

    PG&E has no comment on these recommendations.

11. *As part of the state policy reducing GHG emissions, the Energy Commission should examine the policy implications of lifecycle GHG assessments for energy technologies, including nuclear power. The State, in conjunction with other western states, should also decide what role imported or in-state nuclear power can play in a low-GHG emissions portfolio.*

    PG&E believes that nuclear power plays a critical role in helping the state meet its GHG emission goals and reduction strategies. PG&E does not object to a comprehensive review of lifecycle emissions for all generation technologies, including renewables, but believes that there is no reason to focus only on nuclear power generation in identification of lifecycle environmental effects. The report should more carefully delineate the lifecycle environmental effects of all generation

technologies to allow a fair comparison. The draft report, in high summary, suggests that lifecycle impacts for other technologies, including renewables, are equal to or greater than nuclear power. A fair assessment would conclude that the impact of lifecycle emissions is not a unique or significant issue for nuclear power as compared to other technologies.

12. *The Energy Commission should continue to assess the reliability implications of federal and state once-through cooling regulations.*

    PG&E concurs with this recommendation and commends the Energy Commission for its efforts thus far to ensure that reliability impacts are evaluated and properly weighed as we move forward on once through cooling regulations.

13. *California utilities should be directed to develop power supply contingency plans in the event that performance degradation at the state's nuclear power plants leads to prolonged plant outages.*

    PG&E believes that this is also a generic issue across all generation technologies and that there is no basis for singling out nuclear power in the recommendation. In fact, the data presented in the report suggests that nuclear power reliability and safety has increased substantially in recent years. Diablo Canyon, in particular, has achieved some of the best operating results in the country. Supply contingency plans should be evaluated in the utilities' long term procurement plans submitted to the CPUC, but there is no reason to single our nuclear power in this exercise.

14. *The State should continue to monitor the status of DOE's programs and the cost and progress of new reactor development in the U.S. When more information is available, the State should seek to determine the fuel cycle costs and performance of advanced reactors.*

    PG&E has no comments on this recommendation.

RESPONSE TO OTHER TOPICS:

RESPONSE TO SEISMIC AND TSUNAMI ISSUES

On page 155, paragraph 3, the report incorrectly cites as the source document for the requirement that PG&E update the long term seismic plan (LTSP) to the permit for the DCPP dry cask storage project. In fact, the CPUC, in the environmental impact report prepared in connection with the DCPP steam generator replacement project adopted a mitigation measure to offset the potential for ground shaking to affect the integrity of the old steam generator storage facility. Specifically, mitigation measure G-3a required that PG&E update the LTSP with new earthquake data obtained since the LTSP was submitted and to design the old steam generator storage facility consistent with the updated seismic date. PG&E has fulfilled this mitigation requirement.

Over the next 5 years, PG&E will conduct a major study to update the seismic hazard models in the Central California Coast region, including an update of the LTSP results for the Diablo Canyon Power Plant. This study is being implemented through a cooperative research agreement between PG&E and the USGS. It involves collecting new geological, geophysical, and geodetic data in the Central Coast region to help

constrain various tectonic models. New ground motion models from the Pacific Earthquake Engineering Research (PEER) Center and the Southern California Earthquake Center (SCEC) will be included in the hazard update. PG&E plans to complete the study by the end of 2011.

On page 156, paragraph 1, PG&E recommends adding the following text at the end of the paragraph: "Following the 2005 Sumatra earthquake, there has been more attention paid to the tsunami hazards in Coastal California. PG&E is in the final stage of completing a major update of the tsunami hazard at the Diablo Canyon Power Plant. The tsunami hazard update incorporates new information available from the Sumatra earthquake, and other tsunami triggered earthquakes, and uses probabilistic approaches currently being considered for adoption by the NRC. The tsunami hazard report will be submitted to the NRC in 2007."

RESPONSE TO NUCLEAR INSURANCE

Pages 112-113: This section is in Chapter 6 "Cost's of California's Nuclear Power Plants." The paragraph on the bottom of Page 112 attempts to describe the nuclear liability coverage and the additional costs that may be assessed to each utility in the event of a catastrophic nuclear incident. Oddly, this paragraph appears in the section titled "Security Costs." The information in this paragraph makes little or no distinction between nuclear liability and nuclear property insurance. A separate section on Nuclear Property and Nuclear Liability Insurance would add clarity to the document. PG&E's response to the insurance questions in our data response of April 7, 2007, describes these programs in detail.

Pages 196-197: This section in Chapter 11 covers "Reliability of California's Nuclear Power Plants" and includes a discussion of planned and unplanned outages. Beginning at the top of page 197, the document states that "Replacement power costs would be at least partially defrayed by the insurance that PG&E and SCE carry." This statement could be misleading in this context without further clarification. The insurance coverage accurately described in the remainder of this paragraph is part of the [spell out] NEIL I Accidental Outage Insurance Policy. This policy provides insurance for an Outage at a Unit resulting from Accidental Property Damage occurring to Insured Property. The NEIL I Policy would not respond to all outages except as provided by the policy. This sentence should be revised to reflect this limitation. One suggestion would be "For extended outages caused by accidental damage to plant equipment, replacement power costs may be at least partially defrayed by the insurance that PG&E and SCE carry." Alternatively, this information could be described in a separate section on Insurance, most appropriately in Chapter 6.